50 [illegible] 01

REPORT

OF THE

CANADIAN ARCTIC EXPEDITION 1913-18

VOLUME VIII: MOLLUSKS, ECHINODERMS, COELENTERATES, ETC.

GEOLOGICAL SURVEY
JUN 20 1919
LIBRARY

PART A:

Mollusks, Recent and Pleistocene . . William Healey Dall

Southern Party, 1913-16

G
670
1913 C2
v 8, Pt A
c 3

OTTAWA
J. de LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLEN[illegible] MAJESTY
1919

Issued September 24, 1919

G
670
1913
C2t
v.008
pt.A
c.3

SHOUT
SHARE
IT

REPORT

OF THE

CANADIAN ARCTIC EXPEDITION 1913-18

VOLUME VIII: MOLLUSKS, ECHINODERMS, COELENTERATES, ETC.

PART A:

Mollusks Recent and Pleistocene . . William Healey Dall

Southern Party, 1913-16

OTTAWA
J. de LABROQUERIE TACHÉ
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1919

45508—1

Issued September 24, 1919

The Mollusca of the Arctic Coast of America collected by the Canadian Arctic Expedition west from Bathurst Inlet with an Appended Report on a Collection of Pleistocene Fossil Mollusca.

By William Healey Dall, A.M., D.Sc., LL.D.
Honorary Curator of Molluska, U. S. Nat. Museum.

(With three plates.)

The collection of Mollusca in the region indicated by the title of this report is of special interest, since the only collections hitherto made between the Mackenzie delta and the archipelago to the eastward were due to R. Macfarlane of the Hudson's Bay Company, factor of the most northern post of the company, and who, about 1863, made a journey from the head of the delta to the sea and collected *Chrysodomus heros*, *Astarte borealis*, and very thin valves of *Mytilus edulis*, in considerable numbers. The fauna to the eastward of the delta has remained entirely unknown. The great outpour of fresh water from the Mackenzie might reasonably have proved a barrier which the characteristic species of the western Arctic ocean might not have been able to pass, and there was, therefore, a possibility that the eastward fauna would show a considerable infusion of Greenlandic forms.

It may be observed here that the Bering Strait region and the Polar sea north of it have a fauna which, when the truly circumpolar species are eliminated, is markedly distinct from that of the Greenlandic and boreal Atlantic seas. During the Pliocene the Arctic land was lower, and there was more easy communication between the two areas, as is made evident by the discovery in each Pliocene fauna of species now extinct there, but which have survived in the other area. It is convenient, therefore, to refer to the respective faunas of the two areas by the denomination Western or Eastern Arctic fauna.

The result of the tudy of the collection was somewhat unexpected, since it proved that out of all the species collected east of cape Bathurst only five can be considered at present as characteristically Eastern Arctic, namely :—

Arca glacialis Gray.
Lamellidoris cf. *liturata* Beck.
Philine finmarchica M. Sars.
Lamellaria grönlandica Möller.
Littorina grönlan[illegible] Mörch.

The fresh-water and land species are, with the exception of the *Physa*, common to most of boreal America and have an entirely different distribution from the marine forms. They include:—

Succinea chrysis Westerlund.
Agriolimax hyperboreus Westerlund.
Physa jennessi, n. sp.
Aplexa hypnorum Linné.
Lymnaea palustris vahli Beck.
Lymnaea stagnalis appressa Say.
Valvata lewisii Currier.
Pisidium rotundatum Prime.

45508—1½

The northern Lymnaeas are extremely puzzling. I have had a large number, including a series named by Mörch from Beck's types in Copenhagen, with which to make comparisons and I cannot detect from the shells any specific differences between the form we have called *caperata* Say, and the numerous variations of the Greenland type which have passed under the name of *vahli* Beck. I am disposed to regard all of them as boreal mutations of *L. palustris* Müller.

The *Physa* is of unusual interest as the most northern species of the genus, and the only one so far reported from the Arctic coast as properly restricted.

A small collection was made at Orca, in Prince William sound, containing nine species which should be left out of consideration in discussing the Arctic fauna. These, while incorporated in the general list, have not been included in the present review of the Arctic species.

SUMMARY OF MARINE SPECIES.

Arctic species from the western Arctic area west of the Mackenzie River delta	72
Arctic species from east of the delta	58
Total	130
Species common to the two areas	30
Actual number of species	100
New marine species	6

The new marine species from east of the Mackenzie delta are:—

Pseudamussium andersoni (Pl. II, figs. 7 and 8).
Macoma oneilli (Pl. II, fig. 1).

Those from west of the delta:—

Leda (Portlandia) collinsoni (Pl. II, figs. 3 and 4).
Plicifusus johanseni (Pl. III, fig. 1).
Volutopsius stefanssoni (Pl. I, fig. 1).
Margarites ecarinatus (Pl. II, figs. 5 and 6).

New fresh-water species:—

Physa jennessi (Pl. II, fig. 1).

It will be noted that only five per cent of the marine species are characteristically Eastern Atlantic forms, and with more thorough exploration of the Western Atlantic fauna several of these may prove to be circumpolar species.

Of the forty-two western area species and the twenty-eight eastern area species which were not collected in both areas by the expedition, none are known that are not found in some part of the western area. The fact that they were not collected there by this expedition is purely accidental.

When we examine a map and observe the vast gulf of the Polar sea heading to the southeast in the passages eastward from Cape Bathurst; and on the other hand observe the narrow, tortuous, and ice-blocked passages which communicate with the Greenland seas, it requires no further evidence to explain the failure of the Eastern Arctic fauna to penetrate westward, or the success of the Western Arctic species in colonizing the ground they occupy.

Those who understand the difficulties which hamper the work of a collector in these icy seas will feel appropriately grateful to Mr. Johansen and his associates for these important contributions to our knowledge of the distribution of marine life in a region so inaccessible to the ordinary collector.

The portions of the Arctic region which may be reached with relative ease have been so thoroughly explored for mollusks that little hope is justified for the discovery of undescribed species. It is therefore gratifying that the work of the members of the expedition has been what is really unexpectedly successful in this line.

I have to thank the authorities in Canada, for the care they have taken to do everything that might lighten my labour in preparing this report, and the Direction of the United States National Museum for the free use of all their facilities during its preparation. For the accuracy of the station numbers Mr. Johansen is solely responsible.

List of Species collected West of the Delta of the Mackenzie River.

Nucula tenuis Montagu, 23[1].
Leda (*Portlandia*) *arctica* Gray, 23, 27*s*.
Leda minuta Fabricius, 23.
Leda pernula, 23.
Leda radiata, Krause, 23.
Leda intermedia Sars, 20*b c*, 20*d*.
Leda collinsoni Dall, 27*s*.
Yoldia myalis Couthouy, 23.
Yoldia limatula Say, 23 (+ *hyperborea* Lovèn.)
Mytilus edulis Linné, 20*b c*; 20*d*, 24, 60*a*, 20*g*.
Musculus lævigatus Gray, 27*s*, 28*l*, 24, 23.
Musculus niger Gray, 24.
Crenella aff. rotundata Dall, 27*s*.
Pandora sp., 27*s*.
Lyonsia arenosa Möller, 27*s*, 24.
Astarte borealis Schumacher, 23, 24, 26, 27*s*, 28*l*, 28*l*, 54*e*.
Astarte polaris Dall, 54*e*.
Astarte alaskensis Dall, 54*e*.
Cardium californiense Deshayes, 20*b c*; 20*d*, 20*g*.
Cardium corbis Martyn, 60*a*.
Cardium ciliatum Fabricius, 23.
Serripes grönlandicus Gmelin, 20*d*, 23, 24.
Serripes laperousei Deshayes, 22.
Saxidomus giganteus Deshayes, 60*a*.
Protothaca staminea Conrad, 60*a*.
Liocyma beckii Dall, 23, 24, 27*s*.
Tellina (*Peronidia*) *lutea* Gray, 20*d* 20*g*.
Macoma calcarea Gmelin, 23, 24.
Macoma incongrua Martens, 20*d*, [illegible].
Macoma inquinata Deshayes, 60*a*.
Macoma moesta Deshayes, 24.
Macoma balthica Linné, 54*e*, 20*d*.
Macoma inconspicua Broderip & Sowerby, 20*b c*, 20*d*, 20*g*, 24.
Spisula polynyma Stm. var. *alaskana* Dall, 20*g*, 20*m*.
Mya truncata Linné, 23, 24.
Mya intermedia Dall, 20*d*, 24.
Saxicava arctica Linné, 20*d*, 23, 24, 60*a*.
Cyrtodaria kurriana Dunker, 20*d*, 26, 27*s*, 54*e*.
Zirfæa gabbi Tryon, 24.
Coryphella cf. *salmonacea* Couthouy, 20*g*.

[1]The numbers refer to the number of the Collecting Station See page 7a, et [illegible].

Philine cf. *sinuata* Stimpson, 20*g*.
Cylichna nucleola Reeve, 20*b–c*.
Utriculus semen Reeve, 27*s*, 20*b–c*.
Agriolimax hyperboreus Westerlund. Nome, Camden bay.
Succinea chrysis Westerlund, tundra at Nome.
Lymnæa caperata Say; 28*i* (this probably = *vahli* Beck.)
Lymnæa stagnalis Linné, var. *appressa* Say. Mackenzie river delta.
Aplexa hypnorum Linné. Camden bay; Demarcation point; pond on Herschel island; pond at Collinson point; brackish pond near Teller, Grantley harbour; port Clarence, Alaska.
Lora trevelliana Turton, 27*s*.
Admete middendorffiana Dall, 20*d*.
Admete elongata Leche, 23.
Beringius sp. egg-capsules, 20*m*.
Chrysodomus sp. egg-capsules, 20*m*.
Chrysodomus liratus Martyn, 20*b–c*, 20*m*; 23.
Chrysodomus solutus Herrman, 20*d*; 20*g*; 20*m*; 24.
Chrysodomus saturus Martyn, 20*g*; 24.
Plicifusus johanseni Dall, 24.
Plicifusus kroyeri Möller, 23.
Volutopsius stefanssoni Dall, 24.
Buccinum sp. egg capsules, 20*m*, 24.
Buccinum tenue Gray, 22; 23.
Buccinum orotundum Dall, 22.
Buccinum normale Dall, 24.
Buccinum angulosum subcostatum Dall, 24.
Buccinum angulosum Gray, 24.
Buccinum plectrum Stimpson, 24.
Buccinum polare Gray, 24.
Buccinum cyaneum Hancock, 24, 22.
Buccinum glaciale Phipps, 24.
Thais lamellosa Gmelin, 60*a*.
Neptunea beringi Dall, 23.
Fusitriton oregonense Redfield, 30*d* (adventitious).
Boreoscala greenlandica Perry, 23.
Tachyrhynchus erosus Couthouy, 54*e*.
Lacuna divaricata Fabricius, 20*b–c*, 20*g*, 20*h*.
Littorina grandis Middendorff, 20*d*, 20*g*.
Littorina sitkana Philippi, 60*a*.
Piliscus commodus Middendorff, 23; 24.
Natica (*Cryptonatica*) *clausa* Broderip & Sowerby, 20*b–c*; 20*d*; 20*g*; 24; 54*e*.
Euspira pallida Broderip & Sowerby, 23; 24; 28*l*.
Amauropsis purpurea Dall, 20*b–c*; 20*d*; 24, 28*l*; 31*a*; 32*b*.
Velutina zonata Gould, 24.
"*Velutina*" *spongiophila* Middendorff, 24. (Hydroid).
Acmæa scutum var. *patina* Eschscholtz, 60*a*.
Acmæa pelta Eschscholtz, 60*a*.
Acmæa emydia Dall, 22.
Margarites sordidus Hancock, 22; 23.
Margarites ecarinatus Dall, 22.
Mœhœroplax varicosus Mighels, 23.
Amicula vestita Sowerby, 22.

SPECIES OBTAINED AT EACH STATION WEST OF THE MACKENZIE RIVER.

STATION 20*b–c*.

Grantley harbour, port Clarence, in 2–3 fathoms muddy bottom, near Teller, Alaska.

Leda intermedia Sars.
Mytilus edulis L.
Macoma inconspicua Brod. & Sby.
Cardium californiense Deshayes.
Cylichna nucleola Reeve.
Utriculus semen Reeve.
Chrysodomus liratus Martyn (young).
Lacuna divaricata Fabr.
Natica clausa Brod. & Sby.
Amauropsis purpurea Dall.
Gastropod eggs.

STATION 20*d*.

Grantley harbour, port Clarence, near Teller, Alaska. Beach.

Leda intermedia Sars.
Mytilus edulis L.
Tellina (*Peronidia*) *lutea* Gray.
Macoma inconspicua Brod. & Sby.
Macoma incongrua von Martens.
Macoma balthica L. (young).
Cardium californiense Deshayes.
Serripes grönlandicus Gmelin.
Saxicava arctica L.
Mya intermedia Dall.
Cyrtodaria kurriana Dunker.
Admete middendorffiana Dall.
Chrysodomus solutus Herrman (fragm.).
Littorina grandis Midd.
Natica clausa Brod. & Sby.
Amauropsis purpurea Dall.

STATION 20*g*.

Port Clarence, Bering strait, Alaska, 2–3 fathoms, sandy mud.

Mytilus edulis L., also young, on floating kelp, sta 20*h*.
Tellina (*Peronidia*) *lutea* Gray.
Macoma inconspicua Brod. & Sby.
Cardium californiense Deshayes.
Spisula polynyma (Stm.) var. *alaskana* Dall.
Coryphella[1] cf. *salmonacea* Couthouy; and ovicapsules.
Philine cf. *sinuata* Stm.
Littorina grandis Midd.
Chrysodomus solutus Herrman
Chrysodomus saturus Martyn.
Lacuna divaricata Fabr. (Young); also on floating kelp, 20*h*.
Natica clausa Brod. & Sby., and nidamental capsules.

[1]Greyish brown in colour, the gill filaments white-tipped.

STATION 20*m*.

Beach at port Clarence, Alaska.

Spisula polynyma (Stm.) var. *alaskana* Dall.
Chrysodomus solutus Herrman (fragm.).
Chrysodomus liratus Martyn.
Chrysodomus sp. (egg capsules).
Buccinum sp. (egg capsules).

STATION 22.

Latitude 69° 35′ N., longitude 163° 27′ W., 11–12 fathoms, rock and sand bottom, off cape Lisburne, Alaska.

Serripes laperousei Deshayes.
Buccinum tenue Gray.
Buccinum orotundum Dall (Young).
Margarites (*Pupillaria*) *sordidus* Hancock.
Margarites (*Pupillaria*) *ecarinatus* Dall.
Acmæa emydia Dall.
Amicula vestita Sowerby.

STATION 23.

Latitude 70° 24′ N., longitude 161° 25′ W., off Sea Horse islands, Alaska, 9–10 fathoms, mud with pebbles.

Leda minuta Fabr.
Leda pernula Möller.
Leda radiata Krause.
Leda arctica Gray.
Nucula tenuis Mont.
Yoldia myalis Couth.
Yoldia limatula Say.
Musculus laevigatus Gray.
Macoma calcarea Gmelin.
Serripes grönlandicus Gmelin.
Cardium ciliatum Fabr.
Astarte borealis Schum.
Liocyma beckii Dall.
Saxicava arctica L.
Mya truncata L. (young).
Admete elongata Leche.
Chrysodomus liratus Martyn.
Plicifusus kroyeri Möller.
Buccinum tenue Gray.
Neptunea beringi Dall.
Euspira pallida Brod. & Sby.
Euspira sp., (ovicapsules).
Piliscus commodus (Midd.)
Margarites (*Pupillaria*) *sordidus* Hancock.
Machæroplax varicosus Mighels.

STATION 24.

Sandspit at point Barrow, Alaskan Arctic coast.

Mytilus edulis L.
Musculus niger Gray.
Musculus laevigatus Gray.
Serripes grönlandicus Gmel.
Astarte borealis Schum.
Macoma calcarea Gmelin.
Liocyma beckii Dall.
Saxicava arctica L.
Mya truncata L.
Mya truncata var. *uddevallensis* Forbes.
Mya intermedia Dall.
Zirfæa gabbi Tryon.
Chrysodomus solutus Herrman.
Chrysodomus saturus Martyn.
Plicifusus johanseni Dall.
Volutopsius stefanssoni Dall.
Buccinum normale Dall.
Buccinum angulosum (Gray) *subcostatum* Dall.
Buccinum angulosum Gray (s. s.).
Buccinum plectrum Stm.
Buccinum polare Gray.
Buccinum cyaneum Hancock.
Buccinum glaciale Phipps.
Boreoscala greenlandica (Perry).
Velutina zonata Gould.
"*Velutina*" *spongiophila* Midd. (Hydroid).
Piliscus commodus Midd.
Natica clausa Brod. & Sby.
Euspira pallida Brod. & Sby.
Amauropsis purpurea Dall.
Buccinum, *Chrysodomus*, etc., (ovicapsules).

STATION 26.

Spy island, Alaskan Arctic Coast, beach.

Astarte borealis Schum.
Cyrtodaria kurriana Dunker.

STATION 28*i*.

Hot Spring creek, Sadlerochit river, inland from Camden bay, Alaskan Arctic coast.

Lymnea caperata Say, dwarfed.

STATION 27*s*.

Off Collinson point, Alaskan Arctic coast, 3 fathoms, mud and gravel.

Leda arctica Gray.
Leda collinsoni Dall.
Musculus laevigatus Gray.
Crenella aff. *rotundata* Dall.
Astarte borealis Schum. (fragm.).
Liocyma beckii Dall.
Pandora sp. (fragm.).
Macoma sp. (fragm.).
Macoma sp. (fry).
Mya sp. (fry).
Cyrtodaria kurriana Dkr.
Lyonsia arenosa Möller.
Lora trevelliana Turton, var.
Utriculus semen Reeve.
Euspira sp., (ovicapsules).
Gastropod eggs.

STATION 28*l*.

Beach at Collinson point, Alaskan Arctic coast.

Musculus lævigatus Gray.
Astarte borealis Schum.
Euspira pallida Brod. & Sby
Amauropsis purpurea Dall.

STATION 28*t*.

Beach at Flaxman island, Alaskan Arctic coast.

Astarte borealis Schum.

STATION 30*d*.

Beach at Demarcation point, Alaskan Arctic coast.

Fusitriton oregonense Pedfield (adventitious).

STATION 31*a*.

Beach at Camden bay, Alaskan Arctic coast.

Amauropsis purpurea Dall.

STATION 32*b*.

Sandspit west of Martin Point, Alaskan Arctic coast.

Amauropsis purpurea Dall.

STATION 54*e*.

Beach at Pauline cove, Herschel island, Arctic coast, Yukon Territory, Canada.

Macoma balthica L.
Astarte borealis Schum.
Astarte polaris Dall.
Astarte alaskensis Dall.
Cyrtodaria kurriana Dkr.
Saxicava arctica Linné.
Tachyrhynchus erosus Couthouy.
Natica clausa Brod. & Sby. (fragm.).

STATION 60*a*.

Beach at Orca, Prince William sound, Alaska.

Mytilus edulis L.
Macoma incongrua v. Marts.
Macoma inquinata Desh.
Cardium corbis Martyn.
Saxidomus giganteus Desh.
Protothaca staminea Conrad.
Saxicava arctica L.
Thais lamellosa Gmelin.
Littorina sitkana Philippi.
Acmæea scutum Esch., var. *patina* Esch.
Acmæa pelta Esch.

Lake at Konganevik, Camden bay, Alaskan Arctic coast.

Aplexa hypnorum L.
Agriolimax hyperboreus Westerlund.

Lake at Demarcation point, Alaskan Arctic coast.

Aplexa hypnorum L.

Pond on Herschel island, Arctic coast, Yukon Territory.

Aplexa hypnorum L.

Pond at Collinson point, Alaskan Arctic coast.

Aplexa hypnorum L.

Brackish pond near Teller, Grantley harbour, Alaska.

Aplexa hypnorum L.

Iglukitaktok, Mackenzie river delta.

Limnæa stagnalis L. var. *appressa* Say.

Tundra, at Nome, Norton sound, Alaska.

Succinea chrysis Westerlund.
Agriolimax hyperboreus Westerlund.

Grantley harbour, Alaska; (stomach of *Pleuronectes*).

Fragments of *Yoldia*, *Serripes*, *Leda*, and other thin bivalves.

List of Species collected East of the Delta of the Mackenzie River at Cape Bathurst and Eastward.

Leda (Portlandia) arctica Gray, 43*b*.
Leda pernula Müller, 43*a*, 43*b*.
Arca glacialis Gray, 43*a*, 43*b*.
Pseudamusium andersoni Dall, 43*a*.
Mytilus edulis Linné, 37*i*, p. 38, 44*h*, 47*a*, 47*b*, 47*c*, 50*f*.
Musculus lævigatus Gray, 35, 37*a*, 37*b*, 41, 41*c*, 43*a*, 43*b*, 43*c*, 47*c*.
Musculus niger Gray, 37*i*, p. 41*c*, 49*r*.
Musculus corrugatus Stimpson, 41*c*, 43*a*.
Musculus vernicosus Middendorff, 43*a*.
Lyonsia arenosa Möller, 43*b*.
Astarte borealis, Schumacher, 35, 37*i*, p. 41*c*, 43*c*, 47*b*, 47*c*, 50*f*, 53*c*.
Astarte vernicosa Dall, 43*c*, 41*c*.
Astarte fabula Reeve.
Cardium ciliatum Fabricius, 37*i*, *p*, *f*, 43*c*.
Serripes grönlandicus Gmelin, 35, 37*i*, *p*, 41, 41*c*, 47*c*, 49*r*, 53*c*.
Pisidium rotundatum Prime, Freshwater ponds near Bernard harbour: also in stomachs of eider duck and trout.
Liocyma beckii Dall, 37*i*, p.
Liocyma viridis Dall, 41*c*, 43*c*.
Thyasira flexuosa Forbes and Hanley, 43*a*.
Macoma calcarea Gmelin, 35, 43, 53*c*.
Macoma oneilli Dall, 43*a*, 43*b*.
Mya truncata Linné, 37*i*, *p*, 41*c*, 43*c*, 47*c*.
Mya intermedia Dall, 43*a*.
Saxicava arctica Linné, 35, 37*a*, 37*i*, *p*, 43*c*, 44*h*, 50*a*.
Saxicava pholadis Linné, 37*i*, 40*a*.
Cyrtodaria kurriana Dunker, 35, 37*b*, 37*i*.
Lamellidoris of. *liturata* Beck, 43*b*.
Philine finmarchica M. Sars, 41, 43*a*.
Utriculus semen Reeve, 42*u*, 41*u*, (fragm.), 48*a*.
Cylichna alba Brown, 41*c*, 42*d*.
Cylichna nucleola Reeve, 40*u*, 42*d* (fragm.), 41.
Aplexa hypnorum Linné. Generally, in fresh water.
Physa jennessi Dall. Ponds east of Bernard harbour.
Agriolimax hyperboreus Westerlund, Bernard harbour.
Lymnæa palustris variety *vahli* Beck, Victoria island and Bernard harbour.
Lora exarata Möller, 41*c*.
Lora beckii Möller, 41*c*.
Admete couthouyi Jay, 43*a*.
Chrysodomus solutus Herrman, 37*i*, p, 47*c*.
Plicifusus kroyeri Möller, 37*i*.
Pyrulofusus deformis Gray, 39.
Volutopsius sp. (fragments), 37*i*, 40*a*.
Beringius sp. (ovicapsule), 37*i*, 40*a*.
Ancistrolepis magnus Dall, 37*i*, 40*a*.
Buccinum angulosum Gray, 37*i*, 41, 43*c*.
Buccinum normale Dall, 41.
Buccinum plectrum Stimpson, 37*i*.
Buccinum polare Gray, 37*i*, 43*c*.
Buccinum ciliatum Fabricius, 37*i*, 40*a*.
Buccinum cyaneum Bruguière, 37*i*, 41, 41*h*, 43*c*, 49*r*.
Tachyrhynchus erosus Couthouy, 43*a*, 43*b*, 43*c*.
Neptunea clathrata L., 43*c*.

Trichotropis borealis Broderip and Sowerby, 37*i*, 40*a*, 41, 41*c*, 43*a*, 43*b*, 43*c*.
Lamellaria grönlandica Möller, 41*f* (young).
Euspira pallida Broderip and Sowerby, 48*b*, 37*i*.
Amauropsis purpurea Dall, 37*i*, 41*h*.
Littorina rudis variety *grönlandica* Mörch, 44h.
Valvata lewisii Currier, Bernard harbour and Victoria island.
Acmaea emydia Dall, 37*i*, 37*y*, 41c, 43c, 49*g*.
Margarites sordidus Hancock, 41, 41*c*, 42*a*, 43*a*.
Margarites umbilicalis Broderip and Sowerby, 41, 43*c*.
Margarites helicinus Fabricius, 37*b*, 37*a*, 40*a*, 41.
Margarites albulus Gould, 43*a*.
Margarites harrisoni Hancock, 43*a*, 49*g*.
Trachydermon albus Linné, 43*c*.
Tonicella marmorea Fabricius, 43*c*.

Species collected at Each Station East of the Mackenzie Delta.

station 35.

Beach at cape Bathurst, Northwest Territories.

Serripes grönlandicus Gmelin.
Astarte borealis Schumacher.
Musculus laevigatus Gray.
Macoma calcarea Gmelin.
Cyrtodaria kurriana Dunker.
Saxicava arctica Linné.

station 37.

a. Stomach of *Erignathus barbatus*, Bernard harbour, Dolphin and Union strait

Margarites helicinus Fabricius.
Egg capules of unknown gastropods.
Musculus lævigatus Gray.
Saxicava arctica Linné.

b. Two to three fathoms, sandy mud, inner Bernard harbour.

Margarites helicinus Fabricius.
Eggs of nudibranch; loose opercula.
Musculus lævigatus Gray.
Cyrtodaria kurriana Dunker.

c. *o*. As *b* and stomach of *Erignathus barbatus*, Bernard harbour.

Molluscan egg capsules.

i. *p*. At and around Bernard harbour.

Mytilus edulis L.
Masculus niger Gray.
Musculus lævigatus Gray.
Astarte borealis Schumacher.
Cardium ciliatum Fabricius.
Serripes grönlandicus Gmelin.
Liocyma beckii Dall.
Mya truncata Linné.
Saxicava arctica Linné.

Saxicava pholadis Linné.
Chrysodomus solutus Herrman.
Chrysodomus sp. (ovicapsules).
Plicifusus kroyeri Möller.
Volutopsius sp. (fragments).
Beringius sp., (ovicapsules).
Ancistrolepis magnus Dall.
Buccinum angulosum Gray.
Buccinum normale Dall.
Buccinum plectrum Stimpson.
Buccinum polare Gray.
Buccinum cyaneum Bruguire.
Buccinum ciliatum Fabricius.
Trichotropis borealis Broderip and Sowerby.
Amauropsis purpurea Dall.
Acmæa emydia Dall.

y. Beach on Chantry island, Dolphin and Union strait.

Acmæa emydia Dall.

STATION 38.

Coronation gulf, beach of Couper island.

Mytilus edulis Linné.

STATION 39.

Beach at Inman river delta, Dolphin and Union strait, Northwest Territories.

Pyrulofusus deformis Gray.

STATION 40.

a. Beach at and around Bernard harbour.

(Specimens listed under Station 37*i*, *p*.)

u. Stomach of *Erignathus barbatus*, Bernard harbour.

Cylichna sp. (fragment).
Opercula of *Buccinum* sp. indet.
Margarites sp. (fragment).

STATION 41.

Bernard harbour, 5 fathoms, sandy mud (outer harbour).

Musculus lævigatus Gray.
Serripes grönlandicus Gmelin.
Eggs of nudibranchs and indeterminate mollusks.
Philine finmarchica M. Sars.
Utriculus semen Reeve.
Cylichna nucleola Reeve.
Buccinum cyaneum Bruguière (young shells).
Buccinum angulosum Gray.
Buccinum normale Dall.
Trichotropis borealis Broderip and Sowerby.
Margarites helicinus Fabricius.
Margarites umbilicalis Broderip and Sowerby.
Margarites sordidus Hancock.

Bernard harbour (outer harbour), 5 fathoms, muddy bottom.

Musculus lævigatus Gray.
Musculus niger Gray.
Musculus corrugatus Stimpson.
Astarte borealis Schumacher.
Serripes grönlandicus Gmelin.
Liocyma viridis Dall.
Mya truncata Linné.
Nudibranch eggs.
Cylichna alba Brown.
Lora exarata Möller.
Lora beckii Möller.
Buccinum sp. (very young).
Trichotropis borealis Broderip and Sowerby.
Margarites sordidus Hancock.
Acmæa emydia Dall (young).

f. Bernard harbour, in about 3 fathoms, mud.

Musculus lævigatus Gray (young).
Eggs of nudibranch.
Lamellaria grönlandica Möller (young).
Acmæa emydia Dall.

h. Beach, Bernard harbour.

Buccinum cyaneum Bruguière.
Amauropsis purpurea Dall.

STATION 42.

d. Stomach of *Cottus scorpius*, Bernard harbour.

Cylichna sp. (fragm.).

e. u. Stomach of *Erignathus barbatus*, Bernard harbour.

Ovicapsules of *Buccinum* sp.
Loose opercula of *Buccinum* sp.
Utriculus sp. (fragments).
Buccinum operculum (loose).
Margarites sordidus Hancock (fragments).

n. Specimens listed under Station 37*i*, p.

STATION 43.

a. Dolphin and Union strait, in about 50 fathoms, grey mud and stones (off Cockburn point).

Leda pernula Müller.
Area glacialis Gray.
Pseudamusium andersoni Dall.
Musculus lævigatus Gray.
Musculus vernicosus Midd. (young).
Musculus corrugatus Stimpson.
Thyasira flexuosa Forbes & Hanley (young).

Macoma oneilli Dall.
Mya intermedia Dall.
Saxicava arctica Linné.
Philine finmarchica M. Sars.
Admete couthouyi Jay.
Trichotropis borealis Broderip and Sowerby.
Tachyrhynchus erosus Couthouy, variety.
Margarites sordidus Hancock.
Margarites albulus Gould.
Margarites harrisoni Hancock.
Gastropod eggs.

b. Dolphin and Union strait, off Stapylton bay, in about 30 fathoms, mud.

Operculum of *Euspira* sp.
Leda (*Portlandia*) *arctica* Gray.
Arca glacialis Gray.
Musculus lævigatus Gray.
Macoma oneilli Dall.
Lyonsia arenosa Möller.
Lamellidoris cf. *liturata* Beck. The bottom of the foot, etenidia, and rhinophores orange; dorsum olive grey.
Trichotropis borealis Broderip and Sowerby.
Tachyrhynchus erosus Couthouy.

c. West of Cockburn point (Dolphin and Union strait) in 20 to 30 meters, grey mud, stones and algæ.

Musculus lævigatus Gray.
Astarte vernicosa Dall.
Astarte borealis Schum.
Cardium ciliatum Fabricius.
Liocyma viridis Dall.
Macoma calcar Gmelin.
Saxicava arctica Linné.
Mya truncata Linné.
Buccinum angulosum Gray.
Buccinum cyaneum Bruguière.
Buccinum sp. (very young).
Buccinum polare Gray.
Neptunea clathrata Linné.
Trichotropis borealis Broderip and Sowerby.
Tachyrhynchus erosus Couthouy.
Margarites umbilicalis Broderip and Sowerby.
Acmæa emydia Dall.
Trachydermon albus Linné.
Tonicella marmorea Fabricius.
Molluscan egg-capsules.

STATION 44.

b. Cape Barrow, Coronation gulf (about 1 fathom).

Mytilus edulis Linné.
Saxicava arctica Linné.
Littorina rudis, var. *grönlandica* Mörch.
Lacuna sp.

STATION 47.

a. Beach of Richardson island, Coronation gulf, south side of Victoria island

Mytilus edulis Linné.

b. Beach of bay east of Lady Franklin point, Victoria island.

Mytilus edulis Linné.
Astarte borealis Schum.

c. Beach at Austin bay Victoria island.

Mytilus edulis Linné.
Musculus lævigatus Gray.
Astarte borealis Schumacher.
Serripes grönlandicus Gmelin.
Mya truncata Linné.
Chrysodomus solutus Herrman.

e. Beach, Forsyth bay, Victoria island.

Ovicapsules of *Chrysodomus* sp.

STATION 48.

a. From Stomach of *Cottus quadricornis*, Goulburn island, Bathurst inlet, Northwest Territories.

Utriculus sp. (badly digested).

b. From stomach of tomcod, same locality.

Operculum of *Euspira* sp.

g. Beach at cape Lockyer, Coronation gulf.

Buccinum sp. ovicapsules.

STATION 49.

g. From stomach of *Cottus scorpius*, Bernard harbour.

Margarites harrisoni Hancock (badly eroded).
Acmæa cmydia Dall.

r. From stomach of *Somateria v-nigra*, Bernard harbour.

Serripes grönlandicus Gmelin (young, broken).
Musculus niger Gray (fragments).
Buccinum cyaneum Bruguière (fragments).

STATION 50.

a. Beach at Cockburn point, Dolphin and Union strait.

Saxicava arctica Linné.
Buccinum sp. indet.

d. Young point, Dolphin and Union strait.

Eggs of two species of unknown gastropods.

f. Beach at and around Bernard harbour.

Mytilus edulis Linné.
Astarte borealis Schumacher.

STATION 53

c. Beach at cape Bathurst, Northwest Territories (see also sta. 35).

Astarte borealis Schumacher.
Serripes groenlandicus Gmelin.
Mocoma calcarea Gmelin.

STATIONS NOT NUMBERED.

Between cape Baring and Pullen point, Victoria island.

Lymnæa caperata Say. = *vahli* Beck, = *palustris* Müller, mutation.

Lake near Bernard harbour, rom stomach of *Cristivomer namaycush*.

Lymnæa palustris vahli Beck.
Pisidium rotundatum Prime.

Pond near Colville mountains, Victoria island.

Aplexa hypnorum L.

Stomach of *Salvelinus*, Bernard harbour.

Pisidium rotundatum Prime.

Lake opposite Bernard harbour

Aplexa hypnorum L.

Water-hole on tundra at cape Bathurst, Northwest Territories.

Aplexa hypnorum L.

Pond at Bernard harbour.

Aplexa hypnorum L.

Pond east of Bernard harbour -D. Jenness, collector.

Physa jennessi Dall.

Creek at Bernard harbour.

Aplexa hypnorum L.

Under stone at Bernard harbour.

Agriolimax hyperboreus Westerlund.

Lake west of Bernard harbour

Pisidium rotundatum Prime.

Creek at Bernard Harbour.

Lymnæa caperata Say (on the mud).
Aplexa hypnorum Linné (on plants).
Valvata lewisii Currier.

Lake near point Williams, Victoria island.

Lymnæa caperata Say.
Valvata lewisii Currier.

Lake between point Williams and mount Arrowsmith, Victoria island.

Lymnæa caperata Say.

Notes and Descriptions of New Forms.

Genus **Leda** Schumacher.

Subgenus **Portlandia** Moreh.

Leda (Portlandia) collinsoni, n. sp. (Pl. II, figs. 3, 4.)

Shell small, inflated, slightly inequilateral, olivaceous in the young, tending to a dark brownish tint in the adult, the periostracum strong, minutely evenly vermiculately wrinkled all over; anterior end shorter, evenly rounded; posterior portion with a rounded ridge extending to the posterior extremity where it forms a rounded point, the shell being compressed above and below this ridge and the margin below slightly incurved and retractively obliquely truncate; the basal margin is slightly rounded; there is a small lanceolate impressed area in front of the low, slightly opisthocoelous beaks, and a large one behind them, but there is no circumscribed lunule or escutcheon; the interior is white, there is a large triangular resilifer below the beaks and eleven anterior and eight posterior hinge teeth; no indications of a pallial sinus appear on the specimens but the adductor scars are large and conspicuous. Height of specimen 6; length 8.5; diameter 4 mm. Station 27s., off Collinson point, Alaskan Arctic coast, in three fathoms, sandy bottom. Many specimens.

This is a remarkable little shell, quite distinct from its nearest relatives. It is of the same general type as *Leda (Portlandia) arctica* Gray, but much shortened up, smaller and more acute behind in proportion to its size. The curious vermiculation of the surface is probably in great part if not entirely a function of the periostracum. Catalogue Nos. 4150 and 4151 (Ottawa). Types and co-types.

Genus **Pseudamusium** H. & A. Adams.

Pseudamusium andersoni, n. sp. (Pl. II figs. 7, 8.)

Shell suborbicular, translucent white, extremely thin and fragile; hinge line straight, the ears subequal, the right anterior ear slightly convexly striated but with no perceptible byssal notch or etenolium; the right valve with a few faint concentric undulations near the umbo, beyond that smooth, near the lower margin concave and appressed against the margin of the opposite valve; left valve more convex, equilateral, smooth, polished with a few faint irregular radial markings near the base. Interior polished, the ligament very small.

The soft parts in alcohol are small, greenish, the margin of the mantle with very numerous small blackish eye spots, the gills and foot very small.

Length of hingeline 9.5; of disk 24; height 22; max. diameter 5 mm.

Station 43*a*. Dredged in about 50 fathoms, mud and pebbles in Dolphin and Union strait, Northwest Territories. Many specimens.

This species belonging to the group of *P. vitreus, P. grönlandicus* and their allies, is distinguished from any of them by the entire absence of any regular radial sculpture or ornamentation. Denude *P. randolphi* of the Pacific fauna of its radial rows of minute prickles and it would approach the present species. The only other quite smooth species of the group known to me, belongs to the Magellanic fauna.

The species is named after Dr. R. M. Anderson, chief of the Southern Party, of the expedition.

Catalogue Nos. 4235, 4236 (Ottawa). Types and co-types.

Genus **Macoma** Leach.

Macoma oneilli, n. sp. (Pl. II, fig. 1.)

Shell small, thin, oval, compressed, mequilateral, slightly inequivalve, the anterior part more than twice as long as the part behind the umbones; white covered with a dehiscent yellowish-olive periostracum; beaks hardly perceptible, ligament prominent, posterior end with an extremely narrow compressed dorsal margin corresponding to the fold of most species; anterior and posterior ends subequally rounded; dorsal and basal margins nearly equally arcuate; interior chalky white, the hinge with two small but well-marked teeth in each valve, the anterior left cardinal bifid; pallial sinus rounded behind, coalescent below, a little smaller in the right valve than in the other; muscular impressions subequal and of moderate size. Length of shell 21; length in front of the vertical from the beaks 15; height 15; diameter 6 mm. Catalogue No. 4240 (Ottawa).

Station 43*a b*. Dredged in Dolphin and Union Strait in 30 to 50 fathoms, mud and pebbles. Two specimens.

This species is remarkable for its evenly oval shape and flattened valves devoid of the usual posterior twist. Among the various species of *Macoma* in the Arctic seas it approaches nearest to *M. moesta* Deshayes, but is quite distinct It is named in honour of Mr. J. J. O'Neill of the party.

Genus **Physa** Draparnaud.

Physa jennessi, n. sp. (Pl. II, fig. 2)

Shell small, thin, of four whorls, of a dull amber yellow without a darker streak behind the outer lip; apex rounded, rather blunt, surface polished with occasional incrementai irregularities and a microscopic spiral striation obsolete in places; spire shorter than the aperture, the last whorl much the largest, the suture not deep, the whorls moderately rounded; outer lip sharp, inner lip slightly erased and whitened; pillar straight, thickened where it meets the body, with a little depression behind it. Length 8; length of aperture 5; max. diameter 5 mm.

Ponds near Bernard harbour, rare. Collected by Mr. D. Jenness of the party, in whose honour it is named. Catalogue Nos. 4019, 4020 (Ottawa).

This is remarkable as the most northern species known of the genus. By some unexplained factor, perhaps connected with glaciation, the genus *Physa* is not represented in the boreal region of Asia or America between the western Siberian boundary and cape Bathurst. It occurs in southern Siberia among the headwaters of the Amur river. In America the most northerly localities reported are Moose Factory on Hudson bay, and Great Slave lake. The allied genus *Aplexa* seems to take the place of *Physa* in all the boreal region above referred to. When we consider that the large Lymnaeas of the type of *L. stagnalis*

and *Aplexa hypnorum*, abound to the very verge of the Polar sea, it seems difficult to account for the absence of *Physa*, elsewhere associated with them.

Genus **Lora** Gistel.

Lora trevelliana Turton.

Pleurotoma trevellianum Turton, Mag. Nat. Hist., VII, p. 351, 1841.
Mangelia trevelliana Forbes & Hanley, III, p. 452, pl. 112, f. 12, 1853.
Pleurotoma reticulata Brown, 1827, not of Renieri, 1804
Station 27*s*. Off Collinson point, Alaskan Arctic coast, in three fathoms. Also on the Murman and North Atlantic coast.

Several specimens apparently not quite full grown were obtained. They agree with British specimens except that the sculpture is more feeble than in the completely adult individuals. Jeffreys notes that American specimens are smaller than those from Britain, as is also the case with some other mollusks.

Genus **Admete** Kröyer.

Admete elongata Leche.

Admete viridula Fabr. var. *elongata* Leche, K. Svenska Vet. Ak. Handl. Bd. 16, No. 2, p. 48, pl. 1, fig. 13, 1878.

A badly eroded specimen was obtained at station 23, off the Sea Horse islands, Alaska, N. Latitude 70° 24′, in 9-10 fathoms, sandy bottom. This appears to be the shell described in the report of the Swedish expedition to Novaia Zemlia and the Yenisei in 1875 and 1876 under the name above cited. If it is really an *Admete* the plaits on the pillar are obsolete, but the specimen is too imperfect to base a dogmatic opinion upon. Long since it was pointed out that the type specimen of Fabricius' shell is a *Bela*, a fact which I have verified by personal inspection. Also that the *Admete* was first named *costellifera* by J. Sowerby in 1818 from a Crag fossil. The present shell has much the aspect of a *Trichotropis*, and certainly has not the least connection with *Admete costellifera*, or *Admete viridula* auct. *non* Fabricius.

Genus **Plicifusus** Dall.

Plicifusus johanseni, n. sp. (Pl. III.)

Shell fusiform, whitish, with six or more slightly rounded whorls exclusive of the (lost) nucleus; suture distinct, not appressed or channelled; but rather deep; the first three or four whorls are feebly axially plicate, the obscure riblets anteriorly protractive and varying in number up to ten; very faint irregular traces of them, or some of them, may appear on the last whorl; spiral sculpture of numerous straplike flat spirals made duplex by a medial groove and separated by a much narrower interspace crossed by fine incremental lines; canal short, slightly recurved; outer lip arcuate, somewhat produced below the periphery; body and pillar with a coating of enamel; pillar attenuated in front, nearly straight. Length of (decollate) specimen 52; of last whorl 39; of aperture 26; max. diameter 22 mm.

Station 24. Point Barrow sandspit, Alaska. Also collected at Icy Cape, Alaska, by Capt. Everett Smith, in 1874, who presented a specimen to the U. S. National Museum.

The expedition collected a dilapidated specimen at Point Barrow, but I have drawn up the description from the better preserved individual in the collection of the U. S. National Museum. Catalogue No. 4117 (Ottawa).

The species is perhaps nearest to *P. esychus* Dall, from the same region, in which the spire is proportionately longer, the whorls more inflated, and the spiral sculpture less coarse.

It is named in honour of Mr. Frits Johansen, naturalist of the expedition, and to whose energy the larger part of the collection is due.

Genus **Volutopsius** Mörch.

Volutopsius stefanssoni, n. sp. (Pl. I).

Shell large, heavy, rude, pinkish brown with a rosy protoconch and five rapidly enlarging whorls; nucleus swollen, large, irregular, of about two whorls, blunt at the apex; suture distinct, not channelled; whorls inflated, with a high rounded shoulder and five or six obscure swellings at the shoulder which do not become definite ribs; there is no spiral sculpture, but the lines of growth are rude and occasionally lamellose, especially toward the aperture in senile individuals; canal short, wide, slightly recurved; aperture wide, the outer lip thickened but hardly reflected, throat whitish; body in the mature shell with a layer of whitish enamel which extends to the end of the pillar, which is arcuate, shorter than the aperture and obliquely truncate in front. Height of shell 114; max. diameter 65; height of last whorl 87; of aperture 75 mm.

Station 24. Point Barrow, Alaska, sandspit. Also collected by the U. S. Bureau of Fisheries at various stations from the Pribilof and Nunivak islands, Bering sea, northward to the Arctic ocean, in 25 to 56 fathoms. Catalogue 4128 (Ottawa).

Three fragmentary or immature specimens were obtained by the expedition at Point Barrow; a description has been prepared from an adult in the collection of the U. S. National Museum. The shells, as in many other species, sometimes show narrow oblique or zigzag ridges due to some cause not yet determined, but probably abnormal. The species in a general way recalls *V. castanea* Mörch, a much smaller species common on the Aleutian islands. The species is named in honour of the commander of the Canadian Arctic Expedition.

Genus **Margarites** Leach.

Margarites ecarinatus, n. sp. (Pl. II, figs. 5, 6).

Shell pinkish grey, depressed, with about five rapidly enlarging whorls; nucleus minute, glassy; subsequent whorls moderately inflated, separated by a deep but not channelled suture, having a rounded periphery, a wide, completely pervious umbilicus, and a large, very oblique, iridescent aperture. Axial sculpture of very fine silky incremental lines; spiral sculpture of low flattish threads separated by narrower interspaces sometimes carrying a finer intercalary thread; this sculpture is carried over the base but is absent from the walls of the wide umbilicus; aperture rounded, very oblique, the margins sharp, hardly meeting over the body except by a thin layer of enamel. Operculum brown, thin, multispiral. Height of shell 8; max. diameter 15 mm. Catalogue No. 4071 (Ottawa).

Station 22, in N. Latitude 69° 35′ and W. Longitude 163° 27′, dredged in 11-12 fathoms, sandy bottom, 1 specimen. Also represented in the U. S. Nat. Museum by specimens collected in Bering sea, among the Aleutian islands, and as far to the east and southward as Port Althorp, Alaska.

This species is nearest to *M. vorticiferus* Dall, which has about the same range, but presents constant differences. In *vorticiferus* the spire is more elevated and the whorls flattened and carinate at the periphery; the spiral sculpture is generally finer and the axial sculpture coarser. Its measurements are: height 15; max. diameter 20 mm.

Genus **Amicula** Gray.

Amicula vestita Sowerby.

Chiton vestitus Sowerby, Zool. Journ. IV, p. 368, 1829; Conch. Ill., figs. 128, 128*a*, 1839.

Amicula vestita Dall, Proc. U. S. Nat. Mus. I, p. 369, 1879; Sci. Results Expl. of Alaska, p. 89, 1879.

Station 22, off cape Lisburne, Arctic ocean, in North Latitude 69° 35′ and West Longitude 163° 27′, in 11–12 fathoms, rock and sand bottom. Also found in Bering sea northward from the Pribilof islands and on the Atlantic side from the Arctic south to cape Cod on the American coast.

NOTES ON THE LAND AND FRESHWATER MOLLUSKS.

By Mr. Frits Johansen.

(Copied from Journal I.)

Nome, Alaska: A few naked snails (*Agriolimax hyperboreus*) and *Succinea chrysis* collected under loose stones, boards, etc., on tundra. 1916. August 25.

Teller, Port Clarence, Alaska: A few snails (*Succinea chrysis*) collected under old sacks, tins, etc., on tundra near the town. 1913. July 31.

Teller, Alaska: Many fresh-water snails (*Aplexa hypnorum*) collected in brackish tundra-pond between the lake and the sea near the town. August 3.

Sadlerochit river, Camden bay, Arctic Alaska: Hot creek, tributary to Sadlerochit river, about 25 miles inland. On the free (especially upper) sides of the submerged moss covered stones in the creek bed were many small snails (*Lymnæa*) attached in hundreds; these snails besides other snails (*Aplexa*) and small clams (*Pisidium rotundatum*) were also common between the grass on the sandy, stone-free bottom of the creek in shallower water. November 6–7.

Collinson point, Camden bay, Arctic Alaska: In a completely melted tundra-pond I collected a few fresh-water snails (*Aplexa* with the soft parts black) on grass stems. 1914. June 13

Collinson point, Camden bay, Arctic Alaska: In a waterhole on the tundra I collected some smaller fresh-water snails (*Aplexa hypnorum*, young) soft-naked part blue-gray, on grass stems. 1914.5 June 20

Collinson point, Alaska: In a waterhole in and near the beach, I collected the common fresh-water snails (adult *Aplexa*). July 11

Konganevik, Camden Bay, Arctic Alaska: Many fresh-water snails (*Aplexa*) collected in the littoral region of a big lake inland among plants. Found about half a dozen about 15mm. long, black, naked snails (*Agriolimax hyperboreus*) feeding on the pollen of catkins of the common low willow (*Salix* sp.) in the coastal tundra swamp. It was plainly to be seen that the snails really feed on only the pollen, as the yellow anthers were missing or partly missing on the catkins the animals were on, so that only the red filaments were left. These snails had their creeping sole more brownish; and the buccal mass when protruded, showed white, dotted with black on the outer margin; otherwise the animal was completely black. The moist weather during these days probably brought these snails forth from their hiding-places under vegetation, etc.; I tried to keep them alive, but a couple of days later they all died. This is the first time I have found naked land-snails on the June 25–6. July 2

Alaskan Arctic coast. The species is the same as those from Nome, Alaska, and the one from Bernard harbour, N.W.T.

July 4 — Konganevik, Camden Bay, Alaska: On the coastal tundra near the sea was a pond with rich vegetation and a broad fringe of washed-up plant débris at its edge. On this fringe were many empty shells of the common fresh-water snail (*Aplexa*).

May 15. — Demarcation point, Alaskan Arctic Coast: Creeping over the mud-bottom of a just melted pond on the coastal tundra were a couple of *Aplexa*, the common fresh-water snails.

August 14 — Herschel island, Yukon Territory, Arctic Canada: In a pond (not the same as 1916, but both ponds about 100 feet elevation) situated inland on the east end of the island, I collected many 1 to 8 mm. long, brown *Aplexa*.

1916. July 29 August 2. — Same locality (Herschel island): In a pond (not the same as 1914, but both ponds at about 100 feet elevation) situated on the tundra swamp inland at the east end of the island, I collected several fresh water snails (*Aplexa*) among the dense growth of *Hippuris*, etc.

1914 May 28. — Iglukitaktok, West branch of Mackenzie Delta (68° 20′ lat. N., 135° 26′ long. W.): J. J. O'Neill collected *Lymnæa appressa* floating in the fresh water flooding the ice, near the marshy margin of a small lake.

9116. July 26. — Cape Bathurst, Northwest Territories, Canada: The common fresh water snails (*Aplexa*) collected in waterholes in the tundra back of the sandspit.

1915. June 26. — Bernard harbour, Northwest Territories, Canada: Lake trout (*Cristivomer namaycush W.*) caught by Eskimo in lakes around here had in their stomachs about a dozen 2-5 mm. clams. The youngest clams had the shell pure white; the older ones had this greyish (*Pisidium rotundatum*). In the different larger ponds I found the shallow-water snails (*Aplexa*) attached to the grass stems or as empty shells on the mud-bottom. Shell brown; protruding, soft body-part grey; head almost black.

1916 April 1915 June 28. Aug. 6.

June 28. — Bernard harbour: From stomach of lake-trout, caught as June 26, 1 snail (*Lymnæa vahli*) and many *Pisidium rotundatum*.

August 16. — Under a stone on moist ground (tundra) inland, I found a 15 mm. long brown, naked Pulmonate snail (*Agriolimax*). Dorsal side (especially mantle-shield, tentacles and their base, and body back of the mantle) black-brown, getting lighter brown laterally, until the whitish (grey) footsole is reached. The rainy weather these days has probably brought this snail out from its hiding place. This is the first and only naked snail I have found east of Mackenzie delta.

September 1. — Fungus (*Agaricus?*) found gnawed by snails.

October 1 Dec. 20. — The trout (*Salvelinus marstoni*) caught by us in the big lake south of the harbour, often had in their stomachs many of the common small fresh-water clams (*Pisidium*).

1916. May 6. — Same locality (Bernard Harbour): A few *Pisidium* from bottom of big lake south of harbour were collected.

June 23 24. — A fresh-water snail (*Aplexa*) collected in the big lake south of the harbour.

July 5. — Many of the common fresh-water snails (*Aplexa*) and a few *Lymnæa* and *Physa* were collected in the shallow bights at the outlet of the big creek from the big lake in valley back of the harbour. Many empty shells of *Lymnæa vahli* and *Aplexa hypnorum* and *Valvata lewisii* found washed up at the mouth of another big creek

at the southwest end of the same lake; up in this creek I also collected many living *Lymnæa* and *Aplexa*.

End of June Beginning of July. 1915.

The fresh-water shells *Aplexa* and *Physa* collected by D. Jenness east of Bernard Harbour.

August.

Victoria island, Northwest Territories, Canada: The following fresh-water snails were collected by D. Jenness:

1. From lakes near point Williams, August 8, 1913: *Lymnæa vahli* and *Valvata lewisii*.
2. From lakes near Mt. Arrowsmith, middle of August: *Lymnæa vahli*.
3. From pond inland near Point Williams, August 15: *Aplexa*.
4. From creek between cape Kendall and Cape Baring, August 31: *Aplexa hypnorum; Lymnæa vahli*.

The Eskimo (Coronation Gulf dialect) name for these *Lymnæa* and *Valvata* is "Siuterkok" (derived from the word for ears). The same name is used for *Buccinum* and other snails.[1]

The common, small fresh-water clam (*Pisidium rotundatum*) is called "Uvillunniak" (= the small clam) by the Coronation Gulf Eskimo. Marine bivalves called "Uvillok."[2]

[1] Any spiral molluscs are called siutukayuk in Mackenzie Eskimo dialect.—R. M. Anderson.
[2] Also called *uvillok* in Mackenzie dialect; *abyat* in Kotzebue Sound dialect.—R. M. Anderson.

REFERENCES TO PLATES.

Plate I.

Fig. 1. *Volutopsius stefanssoni* Dall, nat. size; p. 22A.

Plate II

Fig. 1. *Macoma oneilli* Dall, nat. size; p. 20A.
Fig. 2. *Physa jennessi* Dall, × 3; p. 20A.
Fig. 3. *Leda (Portlandia) collinsoni* Dall; inside view, nat. size; p. 19A.
Fig. 4. The same, outside view; p. 19A.
Fig. 5. *Margarites ecarinatus* Dall, upper surface, magnified one half; p. 22A.
Fig. 6. The same in profile.
Fig. 7. *Pseudamusium andersoni* Dall, left valve, nat. size; the dark center of the disk is the remains of the animal matter; p. 19A.
Fig. 8. The same, right valve.

Plate III.

Fig. 1. *Plicifusus johansoni* Dall, × 2; p. 21A.

APPENDED REPORT.

The Pleistocene Fossils collected on the Arctic Coast of the Yukon and Northwest Territories by the Canadian Arctic Expedition of 1913-18.

By William Healey Dall.[1]

The fossils listed in this report are without doubt all Pleistocene. They belong to species now living in adjacent waters which form part of the Western Arctic fauna. The collection was made largely by Mr. J. J. O'Neill, and from the notes on the labels, the horizon in which the fauna occurs seems to be represented over a very large extent of the Arctic coast from Herschel Island, Yukon Territory to Bathurst inlet, Northwest Territories, and to be identical with that described by Schrader[2] under the name of the Gubik sand, on the Arctic shore of Alaska.

It is rather surprising that the Pliocene Nuwok formation which in Alaska underlies the Gubik sand in many places, with a very characteristic and interesting fauna, is not represented in the Canadian collection.

The material from Herschel island and from the Mackenzie River delta is in a matrix which in each case is of fine grey silt which immediately dissolves in water, but has when nearly dry a certain hard toughness, and when quite dry breaks up into angular fragments. It contains, intermixed with Pleistocene marine shells, a proportion of rock fragments or marine fossils of the Devonian formations so extensively developed in the Yukon Territory to the south and which may have been transported on ice cakes or in the roots of uprooted trees in the spring freshets. Three pieces of brown sandstone from the delta (No. 1885) contain Devonian brachiopod remains, and small palæozoic brachiopods, possibly young *Meristella*, were found loose in the silt from Herschel island.

The following are the species represented in the collection from each of the numbered stations—

Station 1926, south side Herschel island, Yukon Territory—
- *Chrysodomus* cf. *saturus* Martyn (fragm.).
- *Buccinum tenue* Gray (fragm.).
- *Natica* sp. cf. *clausa* Brod. & Sby. (very young).
- *Neptunea beringi* Dall (fragm.).
- *Tachyrhynchus erosus* Couthouy.
- *Astarte borealis* Schumacher.
- *Astarte arctica* Gray.
- *Astarte fabula* Reeve.
- *Astarte alaskensis* Dall.
- *Cyrtodaria kurriana* Dunker.

Station 1942, east side of Herschel island—
- *Natica* sp. (very young).
- *Astarte borealis* Schumacher.
- *Astarte fabula* Reeve.
- *Astarte alaskensis* Dall.

[1] By permission of the Director of the United States Geological Survey.

[2] F. C. Schrader, United States Geological Survey, Professional Paper No. 20, Washington, 1904, p. 20 *et seq.*

For comparison with this list the reader is referred to J. Gwyn Jeffrey's list of Pleistocene fossils found in the northeast part of the Arctic Archipelago – (The Post-tertiary fossils procured in the late Arctic Expedition; with notes on some of the Recent or Living Mollusca from the same Expedition. Annals Natural History, vol 20, ser. 4, 1877. pp. 229–388.)

Station 3486, Kay Point, Yukon Territory
Dentalium sp. (fragm.).
Natica sp. (young fry).
Leda (Portlandia) arctica Gray.
Musculus sp. (fragm.).
Pseudamusium sp. (fragm.).
Macoma sabulosa Spengler.
Astarte borealis Schumacher.
Astarte fabula Reeve.
Saxicava arctica Linné (fragm.).

Station 5282, Arctic sound, Northwest Territories—
Cardium ciliatium Fabricius.
Serripes grönlandicus Gmelin.
Macoma calcarea Gmelin.
Mya truncata Linné.
Saxicava pholadis Linné.

Station 5283, east side Coppermine river, Northwest Territories
Leda (Portlandia) arctica Gray.
Cardium ciliatum Fabricius.
Macoma brota Dall.

Station 5284, west side Coppermine river
Leda pernula Muller.
Cardium ciliatum Fabricius.
Macoma calcarea Gmelin.
Macoma balthica Linné.
Macoma brota Dall.

Station 5285, Victoria island, Northwest Territories—
Macoma inconspicua Broderip & Sowerby.
Mya truncata Linné.
Saxicava pholadis Linné.

Station 5286, Bernard harbour, Dolphin and Union strait, Northwest Territories—
Mytilus edulis Linné.
Astarte borealis Schumacher.
Cardium ciliatum Fabricius.
Serripes grönlandicus Gmelin.
Mya intermedia Dall.
Balanus sp. (fragment).

Station 5287, Kogluktualuk river, Coronation gulf, Northwest Territories—
Leda (Portlandia) arctica Gray.
Macoma calcarea Gmelin.

Station 5288, Port Epworth harbour, Coronation gulf—
Mya? (fragment).

Station 5289, south end of Port Epworth, Coronation gulf—
Saxicava pholadis Linné.
Mya truncata Linné.
Balanus sp. (fragment).

Station 5290, mouth of Inman river, Dolphin and Union strait, Northwest Territories—
Mytilus edulis, Linné.
Macoma calcarea Gmelin.
Saxicava arctica Linné.
Saxicava pholadis Linné.
Mya truncata Linné (young).

Station 5291, south side Bernard harbour, Northwest Territories
Astarte borealis Schumacher.
Saxicava arctica Linné.
Buccinum sp.? (fragment).
Station 5293, north side Bernard harbour, Northwest Territories
Acmaea emydia? Dall.
Mytilus edulis Linné.
Astarte borealis Schumacher.
Macoma calcarea Gmelin.
Saxicava pholadis Linné.
Saxicava arctica Linné.
Mya truncata Linné.
Mya intermedia Dall.
Balanus sp. (fragment).
Station 5294, cape Barrow, Bathurst inlet, Northwest Territories, at 150-foot elevation—
Macoma calcarea Gmelin (fragments).
Saxicava pholadis Linné.
Mya truncata Linné.
Station 5295, Bernard harbour, Northwest Territories—
Astarte borealis Schumacher.
Stations 5298, 5299, Bernard harbour, Northwest Territories
Cardium ciliatum Fabricius.
Serripes grönlandicus Gmelin.
Astarte borealis Schumacher.
Macoma calcarea Gmelin.
Saxicava pholadis Linné.
Saxicava arctica Linné.
Mya truncata Linné.
Station 5300, Cape Lyon, Darnley bay, Northwest Territories
Saxicava pholadis Linné.
Station 5301, 15 miles southwest of cape Lyon, Darnley bay, Northwest Territories—
Astarte sp., indet.
Station 5302, Bernard harbour, Northwest Territories—
Astarte borealis Schumacher.
Station 5497 (40a) Five miles inland from Bernard harbour, Northwest Territories
Saxicava pholadis Linné.
Mya truncata Linné.

All of the thirty species recorded from the several local collections given above are included in the following systematic list:

SYSTEMATIC LIST.

Leda (*Portlandia*) *arctica* Gray	Sta. No.	5283, 5287
Leda pernula Müller	"	5284
Pseudamusium sp.	"	3486
Mytilus edulis Linné	"	5286, 5290, 5293
Musculus sp.	"	3496
Astarte alaskensis Dall	"	1926, 1942
Astarte fabula Reeve	"	1926, 1942, 3485
Astarte arctica Gray	"	1926
Astarte borealis Schumacher	"	5286, 5291, 5293, 5295, 5298, 5299, 5302
Astarte sp. indet.	"	5301
Cardium ciliatum Fabricius	"	5282, 5283, 5283, 5286, 5298, 5299
Serripes grönlandicus Gmelin	"	5282, 5286, 5298

Macoma calcarea Gmelin	Sta. No.	5282, 5284, 5287, 5290, 5293, 5294, 5298
Macoma sabulosa Spengler	"	3486
Macoma balthica Linné	"	5284
Macoma brota Dall	"	5283, 5284
Macoma inconspicua Broderip & Sowerby	"	5285
Mya truncata Linné	"	5282, 5285, 5289, 5290, 5293, 5294, 5497, 5298, 5299
Mya intermedia Dall	"	5286, 5293
Saxicava arctica Linné	"	5290, 5291, 5293, 5299
Saxicava phocadis Linné	"	5282, 5285, 5289, 5290, 5294, 5294, 5497, 5298, 5299, 5300
Cyrtodaria kurriana Dunker	"	1926
Dentalium sp	"	3486
Chrysodomus cf. *saturus* Martyn	"	1926
Buccinum sp.? (fragment	"	5294
Buccinum tenue Gray	"	1926
Neptunea beringi Dall	"	1926
Tachyrhynchus erosus Couthouy	"	1926
Natica sp. cf. *clausa* Brod	"	1926
Acmaea eucplia? Dall	"	5293
Balanus sp. (fragment	"	5286, 5[illegible], 5293

LIST OF COLLECTING STATIONS (WEST TO EAST

1942 -East side of Herschel island, Yukon Territory. Elevation up to 200' A.T

1926 -South side of Herschel island, Yukon Territory. The island is made up of silty mud, with more or less gravel mixed. Fossils were collected from 100 feet above sea level downward

3486 From sandy mud cliffs on Kay point, Arctic coast, Yukon Territory. East side of point, and 3 miles from the end. Sand and sandy mud, almost clay, with thin layers of gravel. Sandy mud contains pebbles stratified, and cross-bedded deposits. Apparently part of the Anaktuvuk feature. Collected from a hillside (100') at elevation 25' A.T

5300 Twenty-five miles southwest of cape Lyon, Darnley bay, Northwest Territories. From gravel, 50 feet elevation, on coast.

5301 -From débris on slope of partly consolidated mud underlying gravel near top of the former Little river (Brock river), Northwest Territories. Ten miles from mouth, about 15 miles south-west of cape Lyon. Elevation about 200' A.T

5290 Mud-gravel about the mouth of Inman river 60 feet to 200 feet, Dolphin and Union strait, Northwest Territories.

5302 From 15 feet elevation on north side of Bernard harbour, south side of Dolphin and Union strait, Northwest Territories

5298 5299 -Sand and gravel terraces from 15 feet above high-water, south side Bernard harbour winter quarters, Dolphin and Union strait.

5295 -North side of Bernard harbour, 15 feet above high-water level

5293 -North side of Bernard harbour, from 30 feet above high-water level

5291 South side of Bernard harbour, 30 feet above high-water level

5286 South side of Bernard harbour. From greenish-grey sand in cut banks at high-water level

5497 Five miles south of Bernard harbour, about 12 feet elevation

5285 South-west part of Victoria island, Northwest Territories. Mud formation between the Colville hills and south coast. D. Jenness, collector. Occurrence general up to 300 feet, none seen higher, although the formation goes above 800 feet. (Jenness

5284 -West side of Coppermine river, 5 miles from mouth, from clay banks 50 feet high. Altitude above present level of river, 3 to 15 feet. Ice-covered. Sticking in the clay on limited stretch of banks. More shells seen higher up the bank

5283 East side of Coppermine river, Northwest Territories, about 6 miles from the mouth, in river banks 50 feet in height

5289 -Mud-gravel of Dolomite hills, south end of Port Epworth, Coronation gulf, 320 feet elevation.

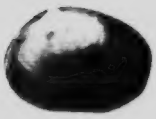
5288 East side of Port Epworth harbour, Coronation gulf, Northwest Territories. From mud-gravel at 500 feet elevation.

5287 Mud-gravel formation, 11 miles up Kogluktuaduk river, Coronation gulf. Twenty-five feet above river bed.

5294 Cape Barrow, Bathurst inlet, Northwest Territories, 150 feet elevation.

CANADIAN ARCTIC EXPEDITION, 1913-16. *(W. H. Dall).*

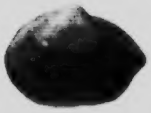
CANADIAN ARCTIC EXPEDITION, 1913-16. *(W. H. Dall).*



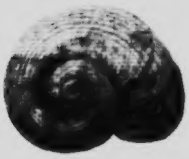
1

2

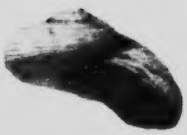
3



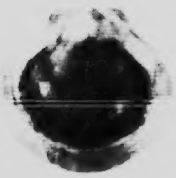
4



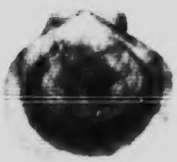
5



6



7



8

CANADIAN ARCTIC EXPEDITION, 1913-16. *(W. H. Dall).*